

Search for a singly produced third-generation scalar leptoquark decaying to a  $\tau$  lepton and a bottom quark in proton - proton collisions at  $\sqrt{s}=13$  TeV (Article) (Open Access)

Sirunyan, A.M.<sup>a</sup>, Tumasyan, A.<sup>a</sup>, Adam, W.<sup>b</sup>, Ambrogio, F.<sup>b</sup>, Asilar, E.<sup>b</sup>, Bergauer, T.<sup>b</sup>, Brandstetter, J.<sup>b</sup>, Dragicevic, M.<sup>b</sup>, Erö, J.<sup>b</sup>, Escalante Del Valle, A.<sup>b</sup>, Flechl, M.<sup>b</sup>, Frühwirth, R.<sup>b,gu</sup>, Ghete, V.M.<sup>b</sup>, Hrubec, J.<sup>b</sup>, Jeitler, M.<sup>b,gu</sup>, Krammer, N.<sup>b</sup>, Krätschmer, I.<sup>b</sup>, Liko, D.<sup>b</sup>, Mädlener, T.<sup>b</sup>, Mikulec, I.<sup>b</sup>, Rad, N.<sup>b</sup>, ...

View additional authors

<sup>a</sup>Yerevan Physics Institute, Yerevan, Armenia  
<sup>b</sup>Institut für Hochenergiephysik, Wien, Austria  
<sup>c</sup>Institute for Nuclear Problems, Minsk, Belarus

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A search is presented for a singly produced third-generation scalar leptoquark decaying to a  $\tau$  lepton and a bottom quark. Associated production of a leptoquark and a  $\tau$  lepton is considered, leading to a final state with a bottom quark and two  $\tau$  leptons. The search uses proton - proton collision data at a center-of-mass energy of 13 TeV recorded with the CMS detector, corresponding to an integrated luminosity of 35.9 fb<sup>-1</sup>. Upper limits are set at 95% confidence level on the production cross section of the third-generation scalar leptoquarks as a function of their mass. From a comparison of the results with the theoretical predictions, a third-generation scalar leptoquark decaying to a  $\tau$  lepton and a bottom quark, assuming unit Yukawa coupling ( $\lambda$ ), is excluded for masses below 740 GeV. Limits are also set on  $\lambda$  of the hypothesized leptoquark as a function of its mass. Above  $\lambda = 1.4$ , this result provides the best upper limit on the mass of a third-generation scalar leptoquark decaying to a  $\tau$  lepton and a bottom quark. [Figure not available: see fulltext.] © 2018, The Author(s).

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